



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/492,780	01/28/2000	Kouji Matsuo	04329.2222	1363

22852 7590

11/04/2002

FINNEGAN, HENDERSON, FARABOW, GARRETT &  
DUNNER LLP  
1300 I STREET, NW  
WASHINGTON, DC 20006

EXAMINER

RAO, SHRINIVAS H

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 11/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/492,780

Applicant(s)

MATSUO ET AL.

Examiner

Steven H. Rao

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-11, 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) 17 and 18 is/are allowed.
- 6) ☐ Claim(s) 12-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of paper submitted under 35 U.S.C. 119(a)-(d), claiming priority from U.S. Serial No. 09/492780 filed on January 28, 200 which itself claims priority from Japanese Patent Application Nos. 11-022688 (filed January 29, 1999) 11-041343 (filed February 19, 1999) and 11-267207 (filed September 21, 1999) which papers have been placed of record in the file.

### ***Continued Prosecution Application***

The request filed on 8/26/2002 for a Request For Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. 09/492780 is acceptable and a RCE has been established. An action on the RCE follows.

### ***Preliminary Amendment Status***

Acknowledgment is made of entry of preliminary amendment filed 8 /21 / 02 which has been entered on August 28, 2002.

Therefore claim 12 as amended by the preliminary amendment and claims 13-15 as originally filed and claims 16-18 as recited in the amendment entered on March 28, 2002 are currently pending in the application.

Claims 1-11, 19-20 were previously withdrawn from consideration.

### ***Specification***

The disclosure is objected to because of the following informalities:

The first line of page 1 of the instant specification must show that the current application is a RCE of the parent case 09/492, 780 filed January 28, 2000.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 12-16 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 12 presently recites that, "said second insulating region formed of an amorphous insulating material " i.e. they have deleted "between the first insulating regions and occupied by".

To the extent Applicants' now intend to claim the second insulating region anywhere other than between the first insulating region and (the metal layer) the same is not supported by the original specification as filed.

Claims 13-16 are rejected for at least depending upon rejected claim 12.

Appropriate correction is required.

Claim 12 is also rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 12 the phrase "said second insulating region formed of an amorphous insulating material " is incomplete as it omits the necessary structural cooperative relationship of materials " it is not clear where is the second insulating region in relation to the other recited elements like the substrate, the metal containing insulating film and the first region insulating region. This omission amounts to a gap between the elements, steps or necessary structural connections. In re Collier, 397 F.2d 1003, 158 USPQ 266 (CCPA 1968).

Therefore the proper placement and relationship between the second insulating region and the other elements may be recited to over come this rejection.

Claims 13-16 are rejected for at least depending upon rejected claim 12.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

Art Unit: 2814

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12 –16 to the extent understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Claims 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu (U.S. Patent No. 5,962,904) and Wittmer Article (Applicants' ids Wittmer, M. et al. "Oxidation Kinetics of TiN thin films", J. App. Phys. Vol. 52 pp. 6659-6664 and further in view of Nakajima et al. (U.S. Patent No. 5,907,188, herein after Nakajima) all previously applied for reasons set out in the last Office Action (and reproduced below for ready reference) and those set out below.

(With respect to claim 12, Hu and Wittmer describe substantially all the structure as claimed. (The previous office action incorporated herein by reference for the sake of brevity).

Hu and Wittmer do not specifically describe the limitation," Including a plurality of first insulating regions each of which is formed of a grain containing a metal oxide".

However the Nakajima reference (previously applied to claims 17 and 18) describes in figs. 31 A –I and col. 31 lines 3 to col. 32 line 50 describes a CMOSFET having a plurality of first insulating regions each of which is formed of a grain containing a metal oxide to from the CMOS devices.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Nakajima's plurality of first insulating regions each of which is formed of a grain containing a metal oxide in Hu and Wittmer's device to form a CMOS.device.

The other added limitation, " a second insulating region formed between the first insulating region and occupied by an amorphous material". (Hu fig. 4 # 18, col. 5 line 55).

For response to Applicants' arguments stated in the preliminary amendment filed 8/28/02 against the applied references to the Final rejection of 5/31/2002 see below (response to the arguments section).

With respect to claim 16, in addition to the previous teachings of Hu and Wittmer, the newly added limitation, wherein the metal containing insulating film includes at least one surface which is covered with a covering insulating region made of amorphous insulating material. (Hu fig.4 14 covered by 18).

Applicants' have not separately argued the patent ability of dependent claims 13-15 and it is presumed were alleged to be allowable at least for depending upon allegedly allowable independent claim 12.

However as shown above independent claim 12 is not allowable and therefore claims 13 1-5 are also not allowable and are rejected for reasons set out in the previous Office Actions and incorporated here by reference.

*Allowable Subject Matter*

Claims 17 – 18 were previously allowed.

*Response to Arguments*

Applicant's arguments with respect to claims 12-16 have been considered but are not persuasive for the following reasons:

Applicants' contend that Hu and /or Wittmer do not teach the limitations recited in claim 12 namely, " a metal-containing insulating film (formed directly or indirectly on said semiconductor substrate, said metal containing insulating film) including a plurality of first insulating regions each of which is formed of a grain containing a metal oxide and a second insulating region, said second insulating region formed of an amorphous insulating material. " (Preliminary amendment page 3)

Firstly, it is noted that the outstanding rejection is based on the combined teachings of Hu, Wittmer and Nakajima and Applicants' above have attempted to respond with a piecemeal analysis of the references, it has been held that one cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references. In re Keller, 208 USPQ 871(CCPA 1981).

Secondly, the applied reference Nakajima col. 31 lines 15-16 describes a first oxide film and lines 23 wherein the underlying layer is amorphous silicon and the first oxide layer is formed by annealing the underlying amorphous silicon layer and tin lines 38-40 amorphous Silicon dioxide is described.

The motivation to combine the references as previously stated is Hu/Wittmer both describes Fets/ MOS and it is well known that CMOS (Nakajima) is formed from FETS namely NMOS and PMOS.



Therefore the Examiner has established prima facie obviousness beyond a shadow of doubt.

It is noted that in response to applicants' arguments set out in page 7 every limitation presently recited has been shown to be prima facie obvious above.

It is noted that the Examiner did not specify that common knowledge/ Official notice was taken and therefore applicants' arguments based on hypothetical assumption need not be dealt with in great detail.

With regard to Applicants' arguments on page 8 it is noted that the previous rejection stated, " The other added limitation, " a second insulating region formed between the first insulating region and occupied by an amorphous material" under rejection of claim 12.

It is noted that Hu fig. 4 # 18 and col. 5 lines 55-60 describes a "

through decomposition of a precursor. Diffusion barrier 18 can be formed by a physical vapor deposition process that reactively sputters a substantially amorphous refractory metal silicide target in a nitrogen containing atmosphere so as to deposit a layer of a substantially amorphous refractory metal silicide nitride material. By way of example, a tung-

and therefore is completely relevant and material to the limitation of claim 12.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is (703) 3065945. The examiner can normally be reached on 8.00 to 5.00.

Art Unit: 2814

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 7463926 for regular communications and (703) 872-9319 for After Final communications.

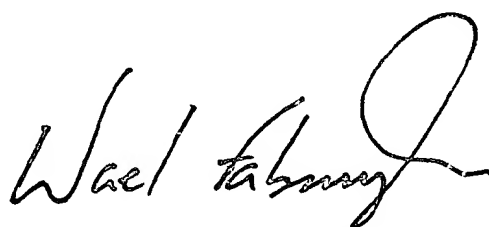
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 3067722.



Steven H. Rao

Patent Examiner

November 1, 2002



SUPERVISORY PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800